

The opinion in support of the decision being entered today was *not* written for publication in a law journal and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

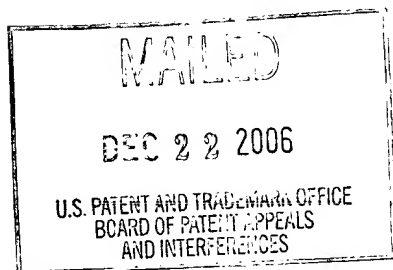
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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* YOSHIAKI UMEHARA, SYOJI KAIUME,  
and TAKENORI TSUCHIYA

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Appeal 2006-3049  
Application 09/695,874  
Technology Center 3600

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HEARD: December 14, 2006

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Before MURRIEL E. CRAWFORD, ANITA PELLMAN GROSS, and  
STUART S. LEVY, *Administrative Patent Judges*.

GROSS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal from the Examiner's final rejection of claims 6 through 11, 13 through 16, and 18 through 28, which are all of the claims pending in this application.

Appellants' invention relates to a caliper body of a disc brake for a vehicle, the caliper body being formed by gravity casting. Claim 6 is illustrative of the claimed invention, and it reads as follows:

6. A caliper body of a vehicular disc brake to be made by a casting method, said vehicular disc brake having a pair of frictional pads disposed opposite to each other with a disc rotor held therebetween, said caliper body including a cylinder disposed on one side of the disc rotor, a reaction pawl disposed on the other side of the disc rotor, and a bridge for coupling said cylinder and said reaction pawl at the outer peripheral side of the disc rotor, said caliper body comprising:

a sprue which is formed at the bottom portion of said cylinder of the caliper body for molding the caliper body with a base material, wherein the caliper body is molded with a cavity disposed with a union hole formed from the sprue, while the side of molding said bottom portion of said cylinder is disposed in a vertically upper part of said cavity and also the side of molding said reaction pawl is disposed in a vertically lower part of said cavity,

wherein a one side of providing said cylinder is made an action chamber; an other side of molding said reaction pawl and said bridge is made a reaction chamber; and a thick-walled connection between said cylinder and said bridge is made a central chamber, and

the ratio of volume of the central chamber to that of the reaction chamber is in the range of 0.6 to 1.25, and

the ratio of volume of the central chamber to that of the action chamber is in the range of 0.7 to 1.35.

The prior art references of record relied upon by the Examiner in rejecting the appealed claims are:

Ogino	US 4,705,093	Nov. 10, 1987
Koide (as translated)	JP 01-146718	June 08, 1989
Kamii (as translated)	JP 08-035530	Feb. 06, 1996
Weiler (as translated)	WO 9827353	June 25, 1998

Claims 6 through 11, 13 through 16, 19, and 23 through 28 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kamii<sup>1</sup> in view of Ogino and Koide<sup>2</sup>.

Claims 18 and 20 through 22 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kamii in view of Ogino, Koide, and Weiler<sup>3</sup>.

Reference is made to the Examiner's Answer (mailed March 21, 2006) for the Examiner's complete reasoning in support of the rejections, and to Appellants' Brief (filed January 6, 2006) and Reply Brief (filed May 18, 2006) for Appellants' arguments thereagainst.

#### OPINION

We have carefully considered the claims, the applied prior art references, and the respective positions articulated by Appellants and the Examiner. As a consequence of our review, we will reverse the obviousness rejections of claims 6 through 11, 13 through 16, and 18 through 28.

Appellants provide arguments regarding the formation of a union hole from the sprue (Br. 5-7), the process of gravity casting to form the caliper body (Br. 8-9), the motivation to combine Koide with the other references (Br. 10-12), and the use of the claimed volume ratios (Br. 9-10). The latter arguments are the ones we find most convincing, and, therefore, are the ones upon which we will focus, as they are dispositive of the appeal.

The Examiner (Answer 5) admits that the proposed combination of Kamii and Ogino does not disclose the claimed volume ratios. The

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<sup>1</sup> The Examiner refers to Kamii as JP'530.

<sup>2</sup> The Examiner refers to Koide as JP'718.

<sup>3</sup> The Examiner refers to Weiler as WIPO 98/27353.

Examiner (Answer 6) asserts that Koide teaches "using optimal volume ratios to achieve little to no sink marks during the cooling process of molten material." The Examiner concludes from this disclosure that it would have been obvious "to have modified the volumes of the various sections of the caliper body of [Kamii], as modified," to satisfy the claimed ratios of the volume of the central chamber to that of the reaction chamber and to that of the action chamber, "or any other optimal volume ratios as determined by routine experimentation . . . to provide a means of minimizing shrinkage and sink marks." The Examiner cites *In re Aller*, 220 F.2d 454, 105 USPQ 233 (CCPA 1955), for the proposition that "discovering the optimum or workable ranges involves only routine skill in the art."

Appellants argue (Br. 9-10) Koide is not related to caliper brakes, does not discuss the particular portions of the mold referenced in the claimed volume ratios, and does not address any particular ratios of volume. Further, Appellants contend (Br. 13) that contrary to the Examiner's statements, the claimed ratios are not obvious design choices, but, rather, are the product of extensive experimentation with unexpected results, as discussed on pages 20-21 of the specification.

We agree with Appellants. Koide, in the abstract, has a general statement that volume ratios are relevant to the elimination of sink marks in the manufacture of a molded product. The material discussed in Koide, in the Explanation of the Drawings, is resin, which is not used in the manufacture of caliper brakes. Further, none of the references discusses ratios of the volumes of the particular portions of a caliper brake. Thus, it is unclear how relevant the teachings of Koide would be to the manufacture of a caliper brake body. Nonetheless, even if the teachings of Koide could be

applied to the manufacture of caliper brakes, none of the references explains how the volume should be adjusted to obtain the benefit disclosed in Koide.

Although optimization of a result effective variable is ordinarily within the level of the skilled artisan, and, thus, *prima facie* obvious, the examiner has pointed to nothing in the references that would suggest that the claimed volume ratios are result effective variables. *See In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The portions of Koide relied upon by the examiner suggest that the volume ratio may be a factor in reducing sink marks, but they do not suggest how to optimize or to get a particular result. Thus, Koide is insufficient to teach that the claimed volume ratios are result effective variables and, thus, that the optimization thereof would have been obvious to the skilled artisan. Furthermore, Appellants show in Figures 10 and 11 that the particular ranges in the claims are unexpected results. Accordingly, there is no *prima facie* case of obviousness, and we cannot sustain the rejection of claims 6 through 11, 13 through 16, 19, and 23 through 28 over Kamii in view of Ogino and Koide.

With regard to claims 18 and 20 through 22, the Examiner adds Weiler to the primary combination to teach using a core, as recited in the claims. However, Weiler fails to cure the deficiency noted *supra* with regard to Koide as applied to the base claims. Consequently, we cannot sustain the obviousness rejection of claims 18 and 20 through 22.


## CONCLUSION

The decision of the Examiner rejecting claims 6 through 11, 13 through 16, and 18 through 28 under 35 U.S.C. § 103 is reversed.

REVERSED

MURRIEL E. CRAWFORD  
Administrative Patent Judge

*Anita Pellman Gross*  
ANITA PELLMAN GROSS  
Administrative Patent Judge

  
STUART S. LEVY  
Administrative Patent Judge

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GREENBLUM & BERNSTEIN, P.L.C.  
1950 ROLAND CLARKE PLACE  
RESTON, VA 20191